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BOTANY.—*A new form of the moonvine* Calonyction aculeatum *with divided corolla limb, and length-of-day behavior and flowering of the common form.*[1]

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The corolla limb of the moonvine *Calonyction aculeatum* is normally undivided. A form has been discovered differing from the typical form only by having the corolla limb divided into five (sometimes four) rounded, distinctly clawed segments. This distinctive form, which appears to have arisen as a mutant, seems worthy of a name and is diagnosed as follows:

Calonyction aculeatum (L.) House f. **apopetalum** Allard, forma nova

Limbus corollae in segmenta 5 (interdum 4) unguiculata divisus.

Type material has been deposited in the U. S. National Herbarium under the number 1871928. Isotypes have also been deposited in the general herbarium collection and the herbarium of introduced plants under the numbers 1871929 and 1871930, respectively. An abundance of herbarium material of the original type plant has been distributed among other large herbaria in the United States, including the Herbarium of the National Arboretum at Beltsville, Md., and the Gray Herbarium at Harvard University.

ORIGIN OF THE NEW FORM

For many years I have grown a number of moonvines each summer at Arlington, Va. As this vine is a native of the American Tropics, where cold is never experienced, the plants are not constituted to withstand winter severity at any stage in northern latitudes. A few plants, however, usually appear spontaneously each spring in my garden. The survival of such seeds seems to be favored by the very hard, impermeable seed coat and the protection afforded by an abundance of leaf litter, which may sometimes accidentally cover and protect them from freezing.

In October 1943 a vigorous seedling appeared in my garden under such circumstances and was left undisturbed until some time in November. For a brief period it was covered with a bucket to protect it from frost; then when it had begun to show signs of injury from the cold nights it was transplanted to a bucket in the warm greenhouse. Here it grew vigorously throughout the winter but showed no evidence of flowering until late in March and April, when the first buds appeared. Early in May 1944 the plant was transferred from the bucket to a spot in my garden where it could climb a high wire fence.

The first open blossom appeared on the evening of June 20. From this date new flowers appeared nightly, their number increasing throughout July and August, and on several nights as many as 45 flowers were displayed at one time. The first ripe seed pods appeared on July 7, the seed coat being mostly brownish in color. The usual color is a uniform black, but some plants produce seeds with entirely white seed coats. In all, 1,015 blossoms appeared on this vine up to and including September 16. Few blossoms appeared after that date.

The corolla limb was divided usually into five broad, rounded, distinctly clawed segments. Only four blossoms departed from this form, these being distinctive in having four segments. The twist of the lobes in the

[1] Received October 12, 1944.

bud is similar to that of the normal form, the direction of twist being clockwise, or from right to left. The pollen grains, as in the normal form, average about 160.15μ in diameter, ranging from 144μ to 165.6μ.

The moonvine normally produces five exserted stamens, which are adnate to the corolla tube, a stamen being situated below or in line with each sinus. In those blossoms having only four lobes, however, or four sinuses, the stamens are always four in number.

Numerous cuttings have been rooted from the original plant and cross pollinations with the normal unlobed form have been made to determine the genetic behavior of the mutant form. An abundance of selfed seed has also been obtained from the original plant, since it was induced to flower very early outdoors and has continued to flower until fall. The moonvine normally does not flower around Washington, D. C., until late in July or August when grown from seeds planted outdoors in May.

LENGTH-OF-DAY BEHAVIOR OF THE MOONVINE

The length-of-day behavior of the moonvine appears to be typical of that of many tropical plants, since it can flower in response to days only 12 hours long at the Equator and also during the much longer days that prevail during the warm growing season in middle latitudes.

Experiments carried out 15 or 16 years ago with seedlings subjected to various constant lengths of day from April 17, the date of germination, have revealed that days much below 12 hours in length may be unfavorable to flowering. The plants experiencing a 10-hour day never flowered, while the plants experiencing a 12-hour day and the controls experiencing full day began flowering July 27. The plants experiencing full day showed indications of becoming less floriferous and finally ceased flowering in September. Since this behavior may have been considered the result of aging, or a response due to lowering temperatures, further studies were made. To test this point a plant was transferred to a large bed of soil in the warm greenhouse September 27. This plant remained in a vigorous growing condition throughout the winter, but buds did not appear until March 29.

The plants experiencing the 10-hour day, which had never flowered, were also brought into the warm greenhouse and given the same conditions. These plants likewise failed to produce buds until April.

The mutant form that germinated in October showed the same nonflowering tendency throughout the winter, since in the warm greenhouse buds did not appear until late in March and early in April, a period of at least 162 days. Experiments have shown that normal plants will flower at Washington, D. C., in summertime when planted outdoors in about 100 days, which is about two months sooner.

This would indicate that the moonvine may show a more or less intermediate behavior in its flowering, since days as short as 10 or 11 hours do not appear favorable to free flowering. Whether there are upper limits with days too long for flowering is not known. A length of day of 14.9 hours from sunrise to sunset, which is the longest day prevailing in the Washington area, does not appear to be very unfavorable to flowering when earlier flowering has been induced.

OTHER CHARACTERISTICS

The moonvine is a very ornamental climber and a worthy addition to any garden. Its big, immaculately white flowers, exhaling a delightful perfume, opening at dusk and enduring until the next morning, always excite admiration in the lover of flowers. The flowers appear to self-pollinate very readily, as the anthers, usually closely investing the stigma in the bud, have dehisced and exposed their large pollen grains even before the flowers have actually expanded their corollas. If plants can be started in the greenhouse in winter and grown to good size before transplanted into the garden in May, flowering can be induced a month or more in advance of those grown from seed outdoors.

The common peduncle of the flowers and the pedicels of the individual blossoms show a strong negatively geotropic behavior, and so the buds and flowers are usually held stiffly erect. After flowering and pollination the thick, enlarged pedicel of the

opened blossom bends downward sharply under the influence of a positive geotropism, causing the enlarging, immature capsules to point earthward. This positive geotropism affects only the individual maturing blossoms of the cluster. Experiments have shown that when the stamens are removed and fertilization is prevented, the pedicels do not bend earthward, and after yellowing they finally dehisce at the base and fall off.

The moonvine under normal summer conditions is a nocturnal flowering plant and in warm weather opens its flowers in the evening some time after sundown. The flowers soon wither the next morning. As the autumn days approach and cooler weather intervenes, the opening of the flowers may be retarded. When the night temperatures become too low the time of flowering is completely reversed. The plants then behave like the morning-glories, their flowers opening only during the day and persisting even until the next day.

During the warm days of late summer the nocturnal flowering of the moonvine is a very persistent behavior. Some years ago I cut off the main stem of a large flowering plant at the ground and noted its subsequent behavior. This plant continued to open its blossoms in the evening at the normal time for one or two evenings until profound wilting had set in.

It would be of some interest to know whether the flowering of the moonvine is seasonal and becomes reduced in the tropical and subtropical conditions of its native home when the shortest days prevail.

As previously stated, flowering outdoors becomes noticeably reduced in September, but lower temperatures conceivably might be an unfavorable condition here. However, plants kept in a greenhouse with warm summer temperatures still tend to become nonflowering. Some change in light conditions appears to be responsible for this behavior. Not only do greatly shortened days intervene in wintertime, but also there is reduction in ultraviolet and other qualities of radiation in the greenhouse during the winter months in temperate regions. Furthermore, there is a great reduction in intensity of radiation throughout the win-

FIG. 1.—Blossoms of mutant form of moonvine, *Calonyction aculeatum* f. *apopetalum;* 0.58 natural size.

ter, since the average maximum intensity is perhaps less than 1,000 foot-candles in comparison with an average of 10,000 foot-candles in summertime. It is evident, then, that while a shortened length of day may appear to explain the nonflowering tendency of the plants in wintertime, this may not be the only factor involved at this season. The failure of the plants to flower under daily durations of summer sunlight of 10 hours, as tests have shown, would appear to be correctly explained as a length-of-day response.

While the moonvine is highly regarded in our gardens only for its beauty, the natives of Central America long ago somehow learned that a decoction of the macerated plant would coagulate the latex of the castilla tree in the production of its rubber. This coagulating characteristic has been studied and a resin has been isolated[2] that may find use in the commercial production of castilla rubber.

The scientific name *Calonyction* is a most appropriate one for this lovely flower, being a compound of the Greek words *kalos*, beautiful, and *nyktios*, nightly, meaning beautiful at night. Surely the flower deserves this characterization.

The flowers are so very fragrant during the warm summer nights that their delightful perfume can be detected some distance from the plants. However, during the cool autumn days and nights the blossoms are almost entirely devoid of fragrance.

[2] Wildman, S. G., McMullan, A. V., and Griggs, Rosamond, *Isolation of an active substance from* Calonyction aculeatum *capable of coagulating castilla latex.* Science **97**: 471–472. May 21, 1943.

BOTANY.—Dipterocypsela, *a new genus of Vernonieae from Colombia.*[1] S. F Blake, Bureau of Plant Industry, Soils, and Agricultural Engineering.

A composite from a little-known area in interior Colombia, referred to me for study by E. P. Killip, of the U. S. National Herbarium, proves to represent a new genus of Vernonieae with somewhat remarkable features of involucre, corolla, and achene.

Dipterocypsela Blake, gen. nov.

Capitula homogama discoidea multiflora. Involucri hemisphaerici phyllaria ca. 3-seriata gradata, extima parva linearia subherbacea saepe cornuta, media oblonga submembranacea margine subscariosa plusminusve concava apice cucullata dorso infra apicem herbaceo-cornuta, intima ovata submembranacea plana inappendiculata. Receptaculum planum nudum. Corollae irregulares 5-fidae, fauce campanulata tubum subaequante, limbo bilabiato, labio exteriore e dentibus 2 longioribus, interiore e dentibus 3 brevioribus constante. Antherae apice appendicibus ovatis praeditae, basi alte sagittatae, auriculis obtusis ecaudatis, eis contiguis connatis. Styli rami anguste linearisubulati hispiduli. Achenia (immatura) late ovalia valde obcompressa saepius bialata, facie interiore 4-costata exteriore 3-costata, alis (una vel ambabus) saepe in cornua productis. Pappus pluriseriatus gradatus fragilis deciduus e setis numerosis hispidulis compositus.—Herba elata succulenta apice bifurcata inconspicue pilosula pilis appressis; folia ampla late ovata repande paucidentata (suprema integra) penninervia sicc. membranacea olivaceoviridia longe petiolata petiolis supra alatis; capitula mediocria numerosa in spicis scorpioideis longis nudis pedunculatis basi interruptis axillaribus v. extra-axillaribus et terminalibus disposita; corollae purpureae. Species typica *D. succulenta*, sp. nov.

Dipterocypsela succulenta Blake, sp. nov.

Herba 2.5 m alta, basi invisa, partis novellis cinerascentibus. Folia inferiora magna, petiolo 9–20 cm longo infra nudo supra cuneate alato, ala interdum 1–2-dentata, lamina late ovata ca. 30 cm longa et lata acuta basi subtruncata vel obscure cordata paucidentata et inter dentes vix evidenter multidenticulata dentibus venulas terminantibus obtusis glandulosis inter se saepius 1.5–3.5 mm distantibus penninervia nervis 8–10-jugis apice curvato-anastomosantibus albidis; folia media minora, basi rotundata; folia suprema multo minora integra v. subintegra, petiolo 1.5–4.5 cm longo, lamina 7.5–11.5 cm longa, 5.5–8.5 cm lata. Pedunculi saepius 5.5–9 cm longi; spicae 8–30 cm longae, duabus terminalibus equalibus v. inaequalibus. Capitula ca. 26-flora basi lata sessilia ebracteata ca. 1 cm diam. 7 mm alta, vel florentia

[1] Received December 14, 1944.